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Impact of the ZTE shutdown

Introduction

President Trump announced on April 16, 2018 that American suppliers would be prohibited from selling components to Zhongxing Telecommunications Equipment Corp (ZTE) for a period of seven years. This announcement was the culmination of a long process, which originated years ago when ZTE was caught selling telecom equipment to North Korea and Iran. The shipments were prohibited by international law, according to UN resolutions and WTO rules that China had agreed to honor. Then, ZTE failed to pay its fines fully and set up elaborate systems to deceive US regulators.

The long history of these fines and sanctions are not the subject of this INSIGHT article. We're more interested in what will happen next.

Political Resolution

This is not an isolated case to be resolved on its merits. No matter what ZTE does in the short term, this case has become a political tennis ball that the US Congress, President Trump, and Premier Xi will use in their trade negotiations.

In theory, ZTE simply needs to pay a fine, fire its management, and agree to ongoing (intrusive) auditing to verify that the company does not continue to sell equipment to sanctioned countries. The company is moving quickly in this direction, and has already taken the extraordinary step of removing their CEO and four other top-level executives.

The current "plan of record" is for ZTE to pay an additional $1.3B, plus placing $400M into an escrow account as insurance against future sanctions violations. These payments will reportedly be reduced by about $360 M, counting a previous fine payment to the US Dept of Commerce as a "prepayment" on the current fine.

There are some other interesting requirements in the recent agreement: ZTE must disclose the level of Chinese government ownership in the company, including government ownership of secondary companies that own ZTE stock. Also, a few pages of the agreement are devoted to very specific restrictions on mis-use of intellectual property by ZTE.

The Dept of Commerce has issued an order which clears the way for ZTE to re-start shipments, upon their payment and their appointment of independent auditors. In a separate order, ZTE is now allowed to buy components and support equipment for "service and support" of cell phones already sold to the public.

So, the deal between Mr. Trump and ZTE's Board of Directors is settled. But the US Congress has been in turmoil over this deal, and the US Senate actually passed a resolution that instructs Mr. Trump to reinstate the ban. The resolution on its own carries no weight, unless the US House of Representatives agrees and the combined Congress sends Mr. Trump a bill to sign, rejecting the deal. Even then, Mr. Trump is likely to veto the Congressional bill, to continue his position with China. We believe that the American political turmoil will be settled in the next month.

Why will Mr. Trump put his foot down, to close this deal with ZTE? There are multiple reasons:

- Shutting down ZTE hurts American chip companies. Qualcomm is a clear stakeholder here as they have lost about $120M in revenue over the past 3 months due to the ZTE ban.
- Mr. Trump needs a positive, constructive step in his larger "trade war" negotiation with China. The $400 B in tariffs are intended to scare China into concessions related to intellectual property, with stricter adherence to WTO rules. So far, the two countries have traded announcements about tariffs, with no constructive movement toward a deal.
- Mr. Trump also needs to establish a positive dialogue with China, to create a template for success in his negotiations with North Korea. Make no mistake, the negotiations over nuclear missiles in North Korea is between the USA and China, not between the USA and North Korea.
- Finally, the US Treasury will collect a billion bucks. The USA would be stupid to reject the money.

Is $1.4 Billion a lot of money?

ZTE started this adventure with $21 billion of assets, including $5B of cash. However, three months after the ban, ZTE has now lost at least $2.5B in cash as their 75,000 employees sit idle and their suppliers prepare long lists of inventory exposure that ZTE will be liable for. ZTE was not in a strong liquidity position three months ago. Their current assets (cash plus immediate receivables and inventory) was barely more than their current liabilities (payables). Note that the reported current liabilities does NOT include the inventory held by suppliers such as Qualcomm, Qorvo, Ampleon, Intel, Xilinx, Texas Instruments, and other companies at ZTE's direction. We estimate that about $1 B

of inventory exposure remains in the supply chain that has not been shown in ZTE's official reports.

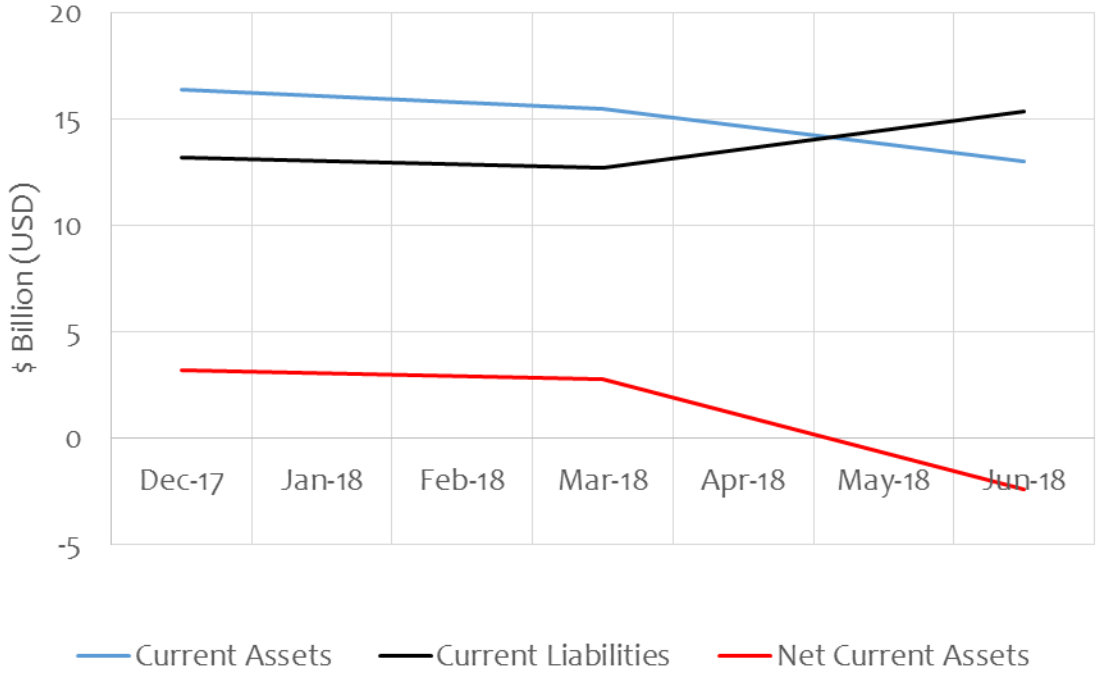

Figure 1. ZTE's liquidity position is already critical

We estimate that ZTE will need to take extraordinary measures to pay the fines this month. They owe more money than they have, so ZTE is in a liquidity crisis already. By renegotiating its payables with vendors and employees, through subsidies or tax credits from the Chinese government, and other small steps, ZTE may be able to survive. To pay the fine now, we believe that they need to borrow money to survive the short-term liquidity crisis.

However, if the shutdown continues for another three months, the company will be out of position and would have difficulty in borrowing money to pay its bills. We believe that if the shutdown reappears, ZTE will need to sell a major product line or factory facility in order to remain afloat.

Will customers stick with ZTE?

ZTE's business is roughly split with 2/3 in the base station market and 1/3 in the handset market. In the handset business, they've lost three major international customers

(AT&T, Telstra, MTN), but we expect that in theory they could re-establish customers quickly because handsets are a fungible commodity.

ZTE should be more concerned about their position in the base station market. The positive side for ZTE: Network customers don't drop a supplier very quickly. ZTE lost one big order with Wind in Italy recently, but there hasn't been enough time for customers to conduct trials, collect quotes, and sign new contracts with competing network providers.

The bigger problems come at two levels:

1. LTE customers in Europe, South Asia, Africa, and other places are actively seeking bids from ZTE's competition. If ZTE can re-start production quickly, then it can make a diving catch and retain these customers. We estimate that ZTE has already lost about $3B in revenue for 2018, but the money has not been spent yet. So ZTE can still reach revenue in the $10B range for 2019 infrastructure sales.

   On the other hand, if ZTE's existing 3G and LTE customers reach the point where they're ready to place orders with Nokia/Ericsson/Samsung/others, then ZTE will start to lose their revenue base. We believe that this will happen if the delay extends another two months.

2. The 5G ramp in China is the single biggest opportunity in the history of the telecom world. Because of the strong preference of the central government to "buy Chinese", ZTE has a strong position. However, their R&D activities have been severely hampered by the inability to buy parts. All three Chinese operators are holding the door open for ZTE, but they might not be able to walk in.

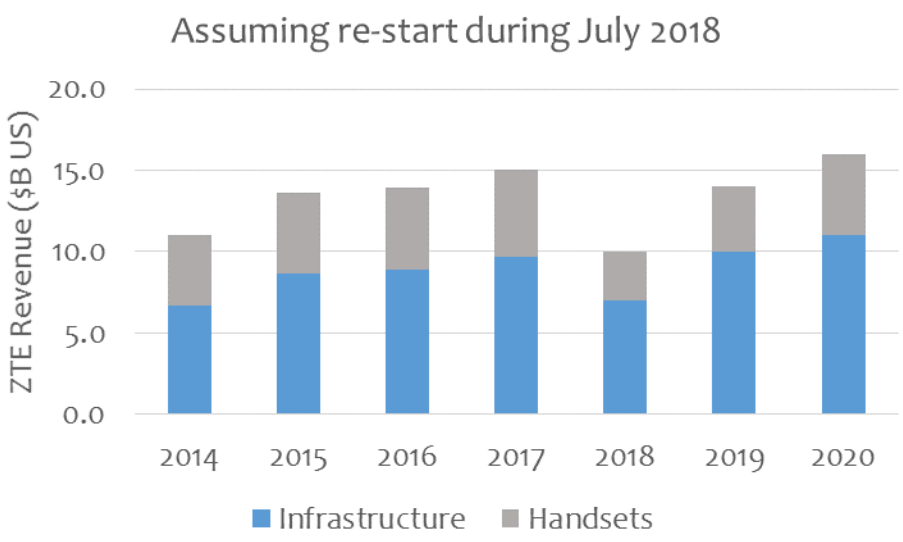

Figure 2. ZTE can regain revenue if they start now

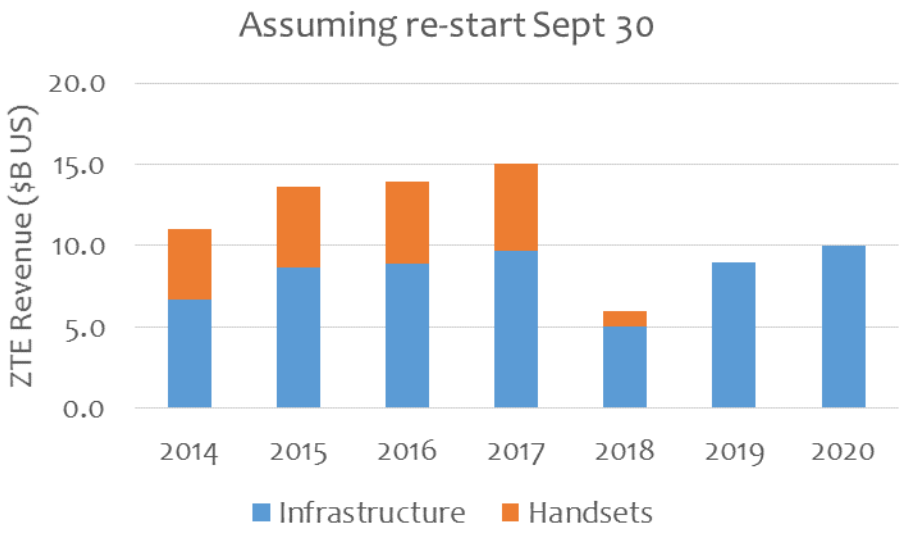

Figure 3. ZTE would lose their handset business with another 2 month delay

If the politics in the USA cause another 2-month delay for ZTE, we estimate that they would need to sell off the handset business to recover in the infrastructure market. They would still be able to capture a large share of the Chinese 5G network deployment, losing about $2 billion annually in international 2G thru 4G network business.

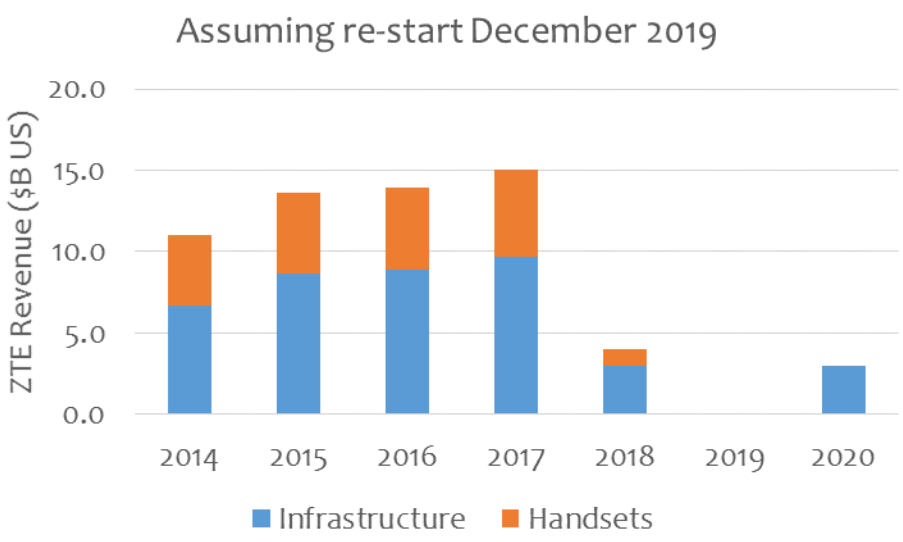

Figure 4. ZTE will not survive an extended shutdown

In a more extreme case, if the shutdown continued through December 2019, we expect that ZTE will not really recover in its current legal form. The company would be likely to resurrect in the early 2020 timeframe to service the existing networks deployed around the world, but ZTE will have lost the 5G wave in China. The company would only be servicing and upgrading the legacy ZTE base stations in the field, with little chance of major 5G growth.

Can ZTE replace the American chips in the RRH?

In the infrastructure market, ZTE is dependent on American chips. Key items in the RRH include:

- FPGAs from Xilinx or Intel
- Wideband data converters from TI or ADI
- Power transistors from NXP

For the RRH, there are a few options. HiSilicon ASICs have replaced the wideband functions of FPGAs for Huawei, so it's theoretically possible for them to buy the ASICs in China.

The data converters might be a problem. We have seen some high performance ADCs/DACs fabricated by TSMC, but so far we haven't seen any LTE base stations using

that process. Fujitsu, or Hitachi may also be able to produce the data converters but our understanding is that they have both been pushed out of the ADC market, even in Japan. Experts in this market estimate that coming up with competitive 5G data converter products would take a non-American competitor at least 18 months.

Can ZTE replace American fiberoptic transceivers?

The RRH also needs to connect to the baseband module, and the 10 Gbps to 40 Gbps fiberoptic transceivers are now required. American suppliers dominate this market as well, because fiberoptic transceivers rely on the same III/V technology as high power RF devices. GaN and similar compound semiconductors have a significant headstart in the US market, where government-funded R&D programs in the 1990s through 2000s resulted in multiple spinoff companies.

WIN Semiconductors has developed a GaN semiconductor foundry service based in Taiwan, and we hear that performance is pretty good. Other GaN fabs have emerged in Europe (ALLOS, X-Fab, Exagan) but to our knowledge they have not reached high volume production for the fiberoptic application. GaN Systems (based in Canada) is working with TSMC to fabricate GaN devices in Taiwan. We believe that between these options, ZTE could recover and establish a source of supply within a few months.

What about baseband processing and core networks?

ZTE depends on Intel processors in their baseband processing, and the companies have been working closely together to extend baseband processing to edge computing and network slicing functions. Can they replace Intel? Yes, it's technically possible but they would have to rewrite a lot of code.

As ZTE moves toward virtualized networks where their software would run on generic servers, they would not need to import the hardware. But they are not there yet… all of ZTE's baseband processing and core network functions are still served by dedicated hardware, with a lot of Intel and Xilinx FPGAs and CMOS processors. Bottom line: We don't think that ZTE will have enough cash to last for 2 years while they reset on a new processor architecture.

What if Huawei gets caught in the trade war?

In most scenarios, we assume that the trade negotiations will result in a peaceful conclusion, and that ZTE will be allowed to return to operations. But what if the political trade war gets worse?

Mr. Trump has hinted that he may also attack Huawei, shutting down component shipments to Huawei to duplicate the ban on ZTE. In the case of Huawei, there are no sanctions violations to North Korea or Iran to use as a pretense, but we don't believe that politicians will have any trouble with creating a story about intellectual property theft.

If this happens, we expect a much bigger impact on the handset market. Huawei's handset business is now larger than Apple, and they have similar dependency on Android and Skyworks in the handset market. Huawei has their own baseband processor capability (HiSilicon) but their strategy of penetrating the top-tier premium handset market would be set back at least 3 years if they were unable to buy American RFFE modules.

Conclusion

ZTE is already in trouble from a cash flow point of view. We believe that if the shutdown continues for 2 more months, that ZTE will sell off its handset business to stay alive in the infrastructure market. The top priority for ZTE (and for their government, which arguably is in control of ZTE) is to deploy a nationwide 5G network….and Huawei cannot be the only OEM to dominate the rollout. As we send this report to customers on July 16, ZTE is now cleared to commence shipments again. We believe they will get help from the Chinese government (through MIIT and all three operators) to catch up on the 5G R&D and pilot deployment. Suppliers should be ready for an intense development effort followed by a rushed 5G ramp.